

Aymeric P. Rousseau

Research Engineer, Center for Transportation Research
Energy Systems Division (ES)
Argonne National Laboratory (ANL)

Professional Experience:

6/99-present Research Engineer
Center for Transportation Research, ES Division

Team leader for the Advanced Vehicle Modeling Software. Defined goals, planning and deadlines for the development of PSAT (Powertrain System Analysis Toolkit). Developed a series of innovative tools specifically oriented towards the key for advanced vehicles (control strategy understanding). Developed unique set of tools to directly integrate test data from ANL advanced powertrain research facility (APRF) into MATLAB for direct comparison with the simulated data. Developed unique techniques allowing PSAT to be one of the most flexible tool for vehicle modeling (i.e., more than 130 configurations are included, about 10 times more than any other tools). Demonstrated the accuracy of PSAT by validating the software at the vehicle and component level within 5% for fuel economy and emission on several driving cycles (vehicles include Japan and U.S. Prius, Honda Insight, Ford P2000, Ford Taurus, Ford Explorer, GM Precept, etc.). Directed several outside software consultants to integrate state-of-the-art control strategies as well as transient component models including engine, electric motor and battery. Oversaw the integration of transient fuel cell models from GCTool into PSAT using an innovative approach in collaboration with ANL/CMT.

7/97 – 5/99 Engineer
PSA Peugeot Citroen Research Center, Paris, France

Responsible of the development of the computer tools for the technical database and decision help process, concerning the vehicle drivetrain configuration choice and the control command system. Initiated the development of a new methodology called “tunnel”, allowing the selection of appropriate hybrid electric vehicles configuration for a particular application. Conceived, structured and applied the majority of the tools which lead to the realization of a program in this area and especially vehicle development according the schedule. Directed outside software consultants to develop specific simulation tools for hybrid electric vehicle applications. Participated in numerous strategy meetings.

1/97 – 5/97 Co-Op Student
PSA Peugeot Citroen Research Center, Paris, France

Responsible of the test of VERT2, a series hybrid electric vehicle using a gas turbine. This task included the definition of the tests, the procedure to follow as well as the realization of the vehicle testing and the post-processing. Directed technicians to develop specific data acquisition systems. Developed fast, generic, and graphical post-processing tools that allowed to automatically generate test reports depending on the type of test performed.

6/96 – 8/96 Co-Op Student
Advanced Battery Group, Industrial System Engineering School (EIGSI)

Developed test procedures for lithium-ion electric vehicle traction system in collaboration with SAFT and PSA Peugeot Citroen as part of the VEDELIC project.

Education:

Postgraduate Degree.	Computing Research Engineering, University of La Rochelle, France, 1997-1998
Master of Science	Multidisciplinary Engineering, Industrial System Engineering School (EIGSI), La Rochelle, France, 1992-1997

Professional Society Activities:

Member of Society of Automotive Engineers

Laboratory Committees:

Member of Transportation Technology R&D Center's "Transportation Workgroup"

Awards:

Recipient of R&D100 Award in 2004 for PSAT.

Publications: Peer Reviewed Conference Papers

- Unless otherwise noted, papers are 8-15 pages in length.
- All publications are to report findings of DOE-sponsored work

Sharer, P., Rousseau,.A., Pagerit, S., Wu, Y., " Impact of FreedomCAR Goals on Well-to-Wheel Analysis ", SAE paper 2005-01-0004, SAE World Congress, Detroit (April 2005)

**Rousseau,.A., Sharer, P., "Comparing Apples to Apples: Well-to-Wheel Analysis of Current ICE and Fuel Cell Vehicle Technologies", SAE paper 2004-01-1015, SAE World Congress, Detroit (March 2004)

**Rousseau, A., Sharer, P., Ahluwalia, R., "Energy Storage Requirements for Fuel Cell Vehicles", SAE paper 2004-01-1302, SAE World Congress, Detroit (March 2004)

**Rousseau,.A., Sharer, P., Besnier, F., "Feasibility of Reusable Vehicle Modeling: Application to Hybrid Vehicles ", SAE paper 2004-01-1618, SAE World Congress, Detroit (March 2004)

Ahluwalia, R, Wang, X, Rousseau,A , and Kumar, R., "Fuel Economy of Hydrogen Fuel Cell Vehicles", Journal of Power Sources (February 2004)

**Rousseau,.A., Ahluwalia, R., Deville, B., and Zhang Q., "Well-to-wheel Analysis of Advanced SUV Fuel Cell Vehicles", SAE paper 2003-01-0415, SAE World Congress, Detroit (March 2003)

**Rousseau, A., Pasquier, M. and Monnet, G. "Trade-Offs Between Fuel Economy and NOx Emissions Using Fuzzy Logic Control With a Hybrid CVT Configuration," SAE paper 03P-375, SAE World Congress, Detroit (March 2003)

Oh S., Rousseau A., Bohn T., Kern J., Pasquier M., Axial Flux Variable Gap Motor: Application in Vehicle Systems, SAE Paper 2002-01-1088, SAE 2002 World Congress & Exhibition, Detroit (March 2002)

**Rousseau, A., Deville, B., Zini, G., Kern, J., Anderson, J., and Duoba, M. "Honda Insight Validation Using PSAT," Future Transportation Technology Conference, Costa-Mesa, 01–FTT49. (August 2001)

**Rousseau, A., Pagerit, S., and Monnet, G. "The New PNGV System Analysis Toolkit PSAT V4.1—Evolution and improvements," Future Transportation Technology Conference, Costa-Mesa, SAE paper 01-2536 (August 2001).

Rousseau, A., and Pasquier, M. "Validation of a Hybrid Modeling Software (PSAT) Using Its Extension for Prototyping (PSAT-PRO)," Global Powertrain Congress, Detroit (June 2001).

Pasquier, M. and Rousseau, A., "Validation Process of a System Analysis Model: PSAT," SAE paper 01P-183, SAE World Congress, Detroit (March 2001).

An, F., and Rousseau, A., "Integration of a Modal Energy and Emission Model into the PNGV Vehicle Simulation Model: PSAT." SAE paper 2001-01-0954, SAE World Congress, Detroit (March 2001).

**Rousseau, A., and Larsen, R. 2000. "Simulation and Validation of Hybrid Electric Vehicles Using PSAT," Global Powertrain Congress, Detroit (June 2000).

Publications: Conference Papers (approved a conference committee)

Pagerit, S., Rousseau, A, Sharer, P, "Global Optimization to Real Time Control of HEV Power Flow: Example of a Fuel Cell Hybrid Vehicle", 20th International Electric Vehicle Symposium (EVS20), Monaco, Monaco (April 2005).

**Rousseau, A, Sharer, P, Pagerit, S., Das, S, "Trade-off between Fuel Economy and Cost for Advanced Vehicle Configurations", 20th International Electric Vehicle Symposium (EVS20), Monaco, Monaco (April 2005).

Kumar, R., Ahluwalia, R., Rousseau, A., "Fuel Economy of Hydrogem Fuel Cell Vehicles", 2003 Fuel Cell Seminar (November 2003)

**Rousseau, A., Saglini, S., Jakov, M., Gray, D., and Hardy, K. "Trade-Offs Between Fuel Economy and NOx Emissions Using Fuzzy Logic Control with a Hybrid CVT Configuration," 19th International Electric Vehicle Symposium (EVS19), Busan, Korea (October 2002).

Pasquier, M., Rousseau, A., Duoba, M, "Validating Simulation Tools for Vehicle System Studies Using Advanced Control and Testing Procedures", 18th International Electric Vehicle Symposium (EVS18), Berlin, Germany, 12 pgs. (October 2001).

Publications: Other Reports and Documents

**Rousseau, A, Sharer, P., and Pagerit, S., PSAT V6.0 Documentation (June 2005), Four books, ~1000 pages.

**Rousseau, A, Sharer, P., and Besnier, F., PSAT V5.1 Documentation (November 2002), 500 pages.

**Rousseau, A. and Besnier, F., Comparison of Toyota US and Japan Prius, DOE report (May 2002).

**Rousseau, A, Sharer, P., and Deville, B., PSAT V5.0 Documentation (November 2001), 350 pages.

**Rousseau, A., and Deville, B., Validation of the Honda Insight Using PSAT, DOE report (September 2001).

**Rousseau, A. and Zini, G., Validation of the Ford P2000 Vehicle Using PSAT, DOE report (September 2001).

Sharer, P., and Rousseau, A., Potential Fuel Economy Improvements of Class 2B Vehicles from Dieselization to Hybridization based upon 21CT Partnership Program Goals using PSAT, DOE report (August 2001)

Sharer, P., and Rousseau, A., Analysis of 42V System Fuel Economy Benefits From Stop and Go to Regenerative Braking and Electrical Assist, DOE report (April 2001).

**Rousseau, A, and Sharer, P., PSAT V4.1 Documentation (April 2001), 200 pages.

Sharer, P., and Rousseau, A., Validation of the Japan Toyota Prius Using PSAT, DOE report (March 2001).

An, F., and Rousseau, A., Validation of the Ford Taurus Using PSAT, DOE report (November 2000).

Oral Presentations:

**Rousseau, A., *Reusable Vehicle Modeling – Application to Hybrid Electric Vehicle*, presented to Mathworks International Automotive Conference (June 2005)

**Rousseau, A., *Impact of Combining Hydrogen ICE with Fuel Cell*, presented to Sig Gronigh from U.S.DOE (March 2005)

**Rousseau, A., *Vehicle Mass Sensitivity Study for Advanced Powertrain Configurations*, presented to Ro Sullivan from U.S.DOE (March 2005)

**Rousseau, A., *Fuel Cell Vehicles Fuel Economy Optimization* presented to Fuel Cell 2004 Conference, Denver, (June 2004)

**Rousseau, A., *Energy Storage System Requirements for Fuel Cell Vehicles* presented to FreedomCAR Joint Technical Team (Vehicle, Battery and Fuel Cell) (June 2003)

**Rousseau, A., *Impact on Control Strategies on Energy Storage System Requirements for Fuel Cell Vehicles* presented to FreedomCAR Joint Technical Team (Vehicle, Battery and Fuel Cell) (June 2003)

**Rousseau, A., *Impact of Energy Storage System Technology on Energy Storage System Requirements for Fuel Cell Vehicles* presented to FreedomCAR Joint Technical Team (Vehicle, Battery and Fuel Cell) (June 2003)

**Rousseau, A., *The Power of Integrated Vehicle Simulation and Validation* presented for ANL 4WD SULEV test facility grand opening at ANL (November 2002)

**Rousseau, A., *Introduction to PSAT Capabilities* presented to TACOM at ANL (November 2002)

**Rousseau, A., *PSAT V5.1 Training Phase I – Use* for FutureTruck 2003 Workshop in Detroit (October 2002)

**Rousseau, A., *PSAT V5.1 Training Phase II – Modify* for FutureTruck 2003 Workshop in Detroit (October 2002)

**Rousseau, A., *PSAT V5.1 Training Phase III – Understand* for FutureTruck 2003 Workshop in Detroit – Phase I, II, III all day training (October 2002)

**Rousseau, A., Modeling Control and Validation of Fuel Cell Transient Behavior, presented to Future Car Congress, Arlington (June 2002).

**Rousseau, A., Multi-platform drivetrain study using PSAT, presented to Future Car Congress, Arlington (June 2002).

**Rousseau, A., *Introduction to PSAT V5.0 capabilities* for download on ANL website, ANL (March 2002)

**Rousseau, A., *PSAT Accomplishments for FY02* presented to the PNGV vehicle system analysis team for Merit Review, Detroit (March 2002).

**Rousseau, A., *ANL's work on HEVs* presented to VALEO at ANL (February 2002)

**Rousseau, A., and Hardy, K., *Overview of DOE's Vehicle System Analysis Toolkit* presented to 21st Century Truck Industry working group in Washington (December 2001)

**Rousseau, A., *Description of PSAT* for training of industry people at USCAR in Detroit – all day training (December 2001)

Hardy, K., and Rousseau, A., *Applicability of PSAT to 21st Century Truck Partnership Technology Development* presented to DOE Sponsors in the Office of Heavy Vehicle Technology in Washington (November 2001)

**Rousseau, A., *Hybrid Electric Vehicle Modeling* presented at FutureTruck 2002 Workshop at Ford World Headquarters (October 2001)

**Rousseau, A., and Hardy, K., *Battery modeling requirements for streamlined development* presented at DOE battery modeling workshop in Crystal City (August 2001)

**Rousseau, A., and Ahluwalia, R., *Fuel Cell Vehicle Analysis at ANL* presented to fuel cell modeling workshop at University of California Davis (July 2001)

Hardy, K., Rousseau, A., Duoba, M., Larsen, R.P., Pasquier, M., *Argonne's Hybrid Electric Vehicle Technology Development Program* presented to International Truck and Engine Company proposing joint research, Melrose Park, IL (June 2001).

**Rousseau, A., *Overview of DOE's Vehicle System Analysis Toolkit with a focus on emission modeling* presented at CLEERS workshop at Oakridge National Laboratory (May 2001).

**Rousseau, A., *Prius and Insight Analysis and Comparison*, presented to Transportation Technology R&D Center's "Transportation Workgroup," ANL (Feb. 2001).

**Rousseau, A., *The PNGV System Analysis Toolkit* presented to the PNGV vehicle system analysis team for Merit Review, Detroit (Dec. 2000).

**Rousseau, A., *Using Forward Modeling of Hybrid Electric Vehicles with PSAT and PSAT-PRO* presented to University of California-Davis hybrid vehicle development team, Davis, California (Oct. 2000).

Larsen, R.P., Rousseau, A., Duoba, M., Pasquier, M. *Heavy Vehicle System Analysis at ANL* presented to DOE Sponsors in the Office of Heavy Vehicle Technology (Aug. 2000).

**Rousseau, A., Pasquier, M., and Duoba, M., *ANL Capabilities on modeling, prototyping and testing* presented to Ford at ANL (July 2000)

**Rousseau, A., Pasquier, M., and Duoba, M., *ANL Capabilities on modeling, prototyping and testing* presented to DaimlerChrysler at ANL (July 2000)

**Rousseau, A., *ANL Systems Analysis Program* presented at AVL, Detroit (July 2000).

**Rousseau, A., and Larsen, R.P., *Argonne National Laboratory's HEV Modeling Activities*, presented to PSA Peugeot Citroen HEV development team, Paris, France (June. 2000).

**Rousseau, A., and Larsen, R.P., *Argonne National Laboratory's HEV Research Program*, presented to PSA Peugeot Citroen HEV development team, Paris, France (Feb. 2000).

**Rousseau, A., *ANL's Work with PSAT and Plans for Hardware In the Loop* presented to Mutasim Salman of GM, chair of PNGV Systems Analysis Technical Team, ANL (Aug. 1999).

Argonne Contractor Reports

Besnier, F., Rousseau, A., Comparison of Japanese and U.S. Prius versions, DOE report to Bob Kost (September 2002)

**Rousseau, A., Deville, B., Honda Insight validation using PSAT, DOE report to Bob Kost (Oct. 2001)

**Rousseau, A., Deville, B., Ford P2000 validation using PSAT, DOE report to Bob Kost (September 2001)

Sharer, P., Rousseau, A., The Japan Prius validation using PSAT, DOE report to Bob Kost (June 2001)

** - Lead Author